

Aim: This study was performed to radiographically evaluate the deflection changes of titanium alloy self-drilling mini implants from the intended path that occurs during placement in varying bone densities.

Method: 63 titanium alloy self-drilling mini implants of the lengths 6mm, 8mm, and 10mm with constant diameter of 1.3mm were used. Three homogenous Solid rigid polyurethane foam (saw bone) with bone densities of 20pcf, 30pcf, and 40pcf were used in this study to simulate anatomic sites for clinical insertion of mini implants in maxilla and mandible. Total of 63 bone blocks, 27 in each bone density of size 2" X 2" X 2" were used. 7 mini implants of each length in all the densities were tested for study. The implants were inserted perpendicularly into artificial bone block held in a custom made stand. One mini implant was inserted per bone block. The bone blocks were then radiographically exposed and the deviation of the long axis of the implant from a true vertical line drawn through the centre of entry of the implant into cortical bone was measured.

Results: There was a decrease in deflection of the mini implant with increase in density. On the other hand, increase in length resulted in increase in the amount of deflection.

Conclusion: Knowledge of bone density in the maxilla and mandible will correlate many of the clinical findings as well as allow the clinician to plan the anchorage strategies and placement of implants with necessary precautions accordingly. Longer mini implants can be used in less dense bone as in maxilla, whereas shorter mini implants can be used in high dense bone as in mandible to increase the stability and success rate of implants. Bone density and implant length play a role in deflection of mini implant from its intended path of insertion. There by evaluation of the relationship of the insertion pathway with the adjacent structures is needed to reduce the iatrogenic damage.

Keywords: Mini implants, mechanical properties of implant materials, deflection, risk factor